Dorothy N. Calder

# BULLETIN

of the

National Association

of

Nurse Anesthetists

February, 1935

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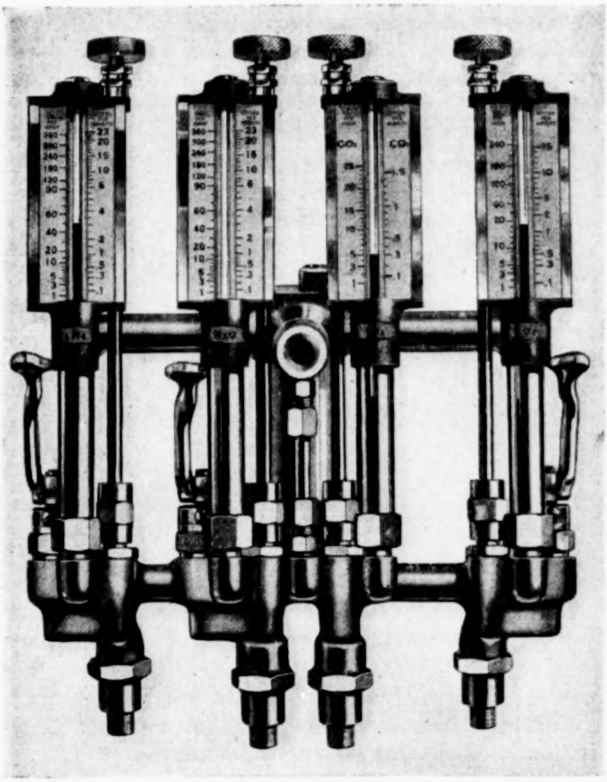

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# BULLETIN

of the

# National Association
of
# Nurse Anesthetists

February, 1935

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# ADDRESS OF THE PRESIDENT

Gertrude L. Fife, Director—Post-Graduate
School of Anesthesia, University Hospitals, Cleveland

It is indeed a pleasure and a privilege to discuss at this, our second annual convention, a few of the problems confronting the nurse anesthetist. We have in the past year added one more page to the history of the National Association, and this page has served to open wide the avenues to our imagination, and has made us realize the immense possibilities of future accomplishments.

To me this gathering of anesthetists, whose chief object is the protection and furtherance of the work concerned with the safeguarding of human lives, clears the way for future progress far-reaching in its influence, and as vitally necessary to future hospital development as any steps that have been taken in the past few years in any other branch of hospital service. In this meeting we see what we most desire to see—a group of women filling a most important place in present-day hospitalization, upholding their vocation and claiming for it the respect and importance it so well deserves. To think of it from the standpoint of personal development only, or to discuss it as a matter of private interest, is to ignore the fundamental reason for the existence of the nurse anesthetist, for the good that has been achieved by the advent of the nurse anesthetist in this field is primarily a public good.

The hospitals and surgeons share in the benefits, and due to the fact that they have through continued efforts in behalf of the nurse anesthetist made it possible for us to reach the favored position we now hold, look to us to do our part not only to maintain the high standard of efficiency already reached by our members, but also to push forward in order that this branch of education will keep abreast with the clear trend of progress in other branches of medical education. Our present problem is not a problem of defense, but of organization, to lead us to more clear-cut methods and more uniform standards of teaching the subject of anesthesia. It is not a case of a threatened educational revolution. It is a case of stimulating the leaders in all schools of anesthesia to give more thought to the methods and the value of more intensive training with a veiw to greater efficiency. If the surgeon, the hospital administrator and the public are to value our work more highly, we must make it more valuable, and in order to do this, more emphasis must be placed on the organization of Anesthesia Departments and the teaching of anesthesia. The apparent indifference to the significance of the work displayed by the schools that are attempting to teach the subject in a few weeks or a few months must be discouraged, and on the other hand the hospitals must be encouraged to allow their graduate anesthetists more time for advancement and study, and contact with others in the field—a privilege especially available at the meetings of this organization.

The articles in this bulletin were read at the Annual meeting held at Philadelphia, September 25-27, 1934.

The National Association of Nurse Anesthetists does not hold itself responsible for any statements made or opinions expressed by any contributor in any article published in its columns.

Educational questions have become increasingly complex, and personal development post-graduation has become essential and not merely a matter of personal pride and choice. In discussing any branch of work the necessity of earning a living cannot be ignored, but the individual today who views her position from the standpoint of personal gain, soon finds that she not only has done herself an injustice, but has jeopardized her future, becomes reactionary and antiquated and a stumbling block to future progress. The formation of this organization was for the purpose of elevating the standards of anesthesia, and there is no doubt but that if we accomplish the standardization of the schools of anesthesia we shall have attained one of our great objectives and will have added one more achievement to the long list of worthy ideals realized by the profession. But the fact remains that while we are working with a view to protect the future, we are reaping present benefits, in the added stimulation, encouragement and knowledge we shall receive by interchanging ideas and discussing the problems arising in our every-day work.

New schools, new courses and the methods of teaching we must perforce leave to be worked out by the leaders of the schools of anesthesia, but as individuals we are making our contribution to the future if we give our whole-hearted support to the maintenance and furtherance of a program assuring a high standard of education for those entering the field, and if in our respective positions we maintain a high standard of efficiency, constantly kept alive by advanced study and continued interest in new developments, with an open mind, critical and constructive.

The meetings of the National Association will afford many the opportunity of coming together to discuss the advanced ideas, but due to the fact that these meetings are held great distances each year from many of our members, it is imperative that we encourage state organizations, to act as clearing houses, in order that more frequent meetings can be held and more direct contact can be secured with the individual member. The state organizations will cooperate with the National in a national educational program, and will undoubtedly act as agents in keeping alive the interest and the strength of purpose needed to carry out a broad constructive program. We must build our organization to function for the good of all, and the National Association can be likened to the hub of a wheel, with the states occupying the position of the spokes—each spoke strong and sturdy, helping to keep the wheel of progress in motion. In order to construct a perfect wheel, however, we must remember that all spokes—whether in the north, south, east or west section—must be built on the same order, with the same purpose in mind and in the same relation to the hub of the wheel and to each other.

We have in the past year witnessed the growth of several strong state organizations. We have several states about ready to organize, and we are confident that another year will see most of the state organizations well under way and doing their part in the educational program within the state.

An intensive program to organize within the states cannot be overemphasized. In the past six months we have heard rumors, and in some instances actual steps are being taken by a certain group of doctors in the medical profession, to try to limit the right to administer anesthetics to those who hold medical degrees. This movement is the result of the economic disturbances, and is not being viewed with favor by the more prominent surgeons and hospitals throughout the country. The creation some twenty years ago, by the hospitals and surgeons, of a definitely organized anesthesia department, in which nurses were chosen to take part, was done in an effort to strengthen a weakened link in service, and the continuance for so many years of the new system—which after all would not have become so popular had it not met the demands—does not appear to justify a return to the older practice. It must be remembered that great strides have been made in anesthesia in the last twenty years, and during that time the demands for the services of the nurse anesthetist have constantly increased. Anesthesia today is a highly specialized branch of medical service, and requires the services of a well trained anesthetist. The nurse anesthetist to a great extent is responsible for the development of a technique, and the teaching of the subject has largely been delegated to the nurse anesthetist. It would therefore take many years to supplant the nurse anesthetist with equally skilled medical anesthetists. The question as to who is rightfully qualified to administer an anesthetic, if brought to an issue, will be dealt with squarely by those responsible for the care and safety of the patient, and the outcome will again demonstrate the leadership and courage of the hospital executives and surgeons who have formulated and followed policies insuring the greatest service to the community and the protection of human lives.

As nurse anesthetists we cannot turn a deaf ear to this controversy. We must give it consideration, and let it serve to stimulate us to maintain the high standards already established and to band together in an effort to accomplish the objectives of our Association. We must direct our endeavors to the fulfillment of a program that will increase our service to the hospitals and the surgeons. We must find a means whereby the hospitals and surgeons employing nurse anesthetists can be assured that the nurse anesthetists have received the proper training and are qualified to do the work. This could be accomplished by obtaining state board registration. I do not believe that state board registration is either practical or possible at this time. Our National Association should immediately take steps whereby this service would be given to the hospitals and surgeons through this organization. An examining board should be chosen by the National Association, and every applicant applying for membership in the organization should be required to pass an examination. The examining board would be responsible for the preparation of the examination—the arrangements whereby the examination would be taken within the state—and responsible for the final decision which would allow the National Association to issue to the individual who successfully passes the examination a certificate signifying that the individual is sanctioned by this organization. More uniform methods of teaching will result from National rather than sectional standards, and whatever program we follow we must aid not only those states strong enough in numbers to organize, but also those states where organization would be impossible.

At this stage in our organization, and during these distressing times, we are forced to make decisions of great importance, and the decisions we make will have a lasting influence upon the future of the work. We cannot falter in the performance of duty, and yet in our enthusiasm we must not attempt to push forward at a speed that would not only hinder our endurance but possibly bring disaster to an otherwise steady but consistent and progressive advance. In our earnest endeavors we shall undoubtedly have discouraging times. We must be prepared to meet these times with courage and stability and continue in the future as we have in the past, to give to our profession the best service that we possibly can.

## ESSENTIALS IN THE TRAINING OF NURSE ANESTHETISTS

By

Dr. Joseph C. Doane
Medical Director, Jewish Hospital, Philadelphia
Clinical Prof. Medicine Temple University School of Medicine

This is a vital subject. Moreover it is a timely subject to consider just at the present, in the light of the discussion that is going on throughout the country as to the status of the nurse anesthetist. Of course, no profession springs up like a mushroom in the night. No profession is just born, like Topsy. Each must pass through a long and painful period of development. We have observed this fact, first, in the medical profession and later in the nursing profession, both of which passed through days of darkness and of discouragement. Social service, occupational therapy, and all the recognized professional endeavors of the day have not just come into being. Their need has been conceived in the mind of somebody and that somebody has found it necessary to convince many other persons that there was a place in the practice of the science of medicine, in the treatment of the sick, for the new group.

We read in hospital and medical magazines much concerning the nurse anesthetist. I think you ought to be all very much complimented that in the past few years the attention of the medical world has been so often focused upon you. I think I know the reason, as do you. The nurse anesthetist has been discovered. Up to this time she was just a person in a white uniform who was seen now and then about the hospital. But anesthesia and the nurse who handles the ether can have now come into prominence.

Of course, the first aim in building a profession and in securing recognition for this profession is the development of standards, standards as to functioning, standards as to relationships with others and, particularly, educational standards.

Every profession, as I have said, has passed through a chaotic period of ineffective and inefficient educational standards; I do not know that anybody knows, I am sure that I do not, whether there are any recognized standards for nurse anesthetist training. I know that here in Philadelphia there are several institutions offering courses in anesthesia. These schools have come into being like some hospitals. Somebody has simply conceived the idea that it would be a good thing to establish a school. Usually this is done because more persons are needed in the operating room and the hospital has not the money to pay for them. So the school is drawn up on a mimeographed form and, lo and behold, some Monday morning it is in existence. There is very little thought given to the fact that when one offers an educational course he immediately takes upon himself a moral obligation to meet certain personnel and educational standards. It is profiteering on human credulity to accept students in a training school, a school for social service or a school for anesthesia unless some very careful thought has been given as to the recompense which the student will receive for the time and money spent.

But unless I am greatly mistaken, schools vary over the country almost as in their number in effectiveness of training, in supervision of actual work performed and even in the extent of the experience given. So that it strikes me that, first of all, before the profession of the nurse anesthetist can ever gain the foothold which it deserves, your body must work out standards which you consider to be adequate for training. These standards then must be accepted by hospitals which propose to give this training. In some way too recognition will have to be secured, from the standpoint of salaries paid, of positions filled, in consideration of the excellence of the training in one school and for deficiency in training in another. When I was a very young man in the medical profession I sat at the head of a table and dozed over the ether can while a particularly slow surgeon searched for an elusive appendix. And why those patients didn't, all of them, succumb to ether intoxication is more than I know. Today, we try to place a trained anesthetist at the right hand of the new intern to keep his eyes on the pupils of the patient and to endeavor to make the patient more safe by diverting the young physician's attention from the interest of the operation.

Now I am convinced, first, that this Association must seriously bend its efforts toward the drawing up of educational standards covering the training of nurse anesthetists. It must emanate, I think, from within this body. Since there are no standards, what I have to say this afternoon will simply represent my own personal opinion, and that, perhaps, isn't very well grounded. I have a feeling, first of all, that it requires a peculiar nervous and mental equipment, from the standpoint of the selection of an applicant for training. I do not think that every type of personality can make a successful anesthetist; I believe there must exist a certain poise and calm under stress which comes, sometimes with experience, but usually is inherent in the nurse's personality and is improved by experience, which is of greatest importance to anesthetists. The selection of persons for acceptance into a school of anesthesia, I think, should be carefully considered and those who seem to be temperamentally unfit should be discouraged, and only those who seem to qualify should be favorably acted upon.

The doctor, of course, seems to believe—not all of them, but here and there we see physicians quoted, to this effect—that all anesthetics should be administered by a physician. You have read that interesting decision of the Superior Court in California which is now hardly off the press, in which that body decided that, at least under the laws of California, the administration of an anesthetic, under the direction of a surgeon is not practicing medicine, as understood there, and that the administration of an anesthetic under the direction of the surgeon in reality came within the prerogatives of nursing. Now there are states in which decisions of this sort have not been as favorable to the nurse anesthetist. Those of you who come from Indiana will know what is brewing there. In this state I believe, there is an Attorney General's opinion that the administration of ether, even though it be under the direction of a physician, verges upon, if not actually becomes, the practice of medicine.

At any rate, the fact that this matter has been discussed, has reached the bar of courts, and has been there argued, is an encouraging and very favorable sign because just that much sooner will legal decisions be reached. I believe that at the head of every anesthesia department or school in a hospital, should be a physician. He should not only possess an M. D. degree, but also should have had some extra training in the administration of general as well as all of the other types of anesthetics. Usually, we find a young physician who hasn't devoted any particular time in fitting himself for a specialty, and who is but nominally at the head of the department. This plan cheapens the importance, I think, of the administration of anesthetics. The State law in Pennsylvania, at least, requires that this be the case. I think it proves the fallaciousness of the argument that all anesthetics should be given by physicians in that it is so difficult to find a single physician on a staff who is willing to devote adequate time to this specialty. I believe that the near future, as soon as the depression lightens, will probably prove to the doubters of today that the nurse anesthetist is a rather necessary adjunct to the hospital personnel.

Again, if your activities are measured by the proper standards, that thing which is best for patients can be justified. If it is best for the patient for doctors to give anesthetics, then you and I want them to do so. If it is best for trained nurse anesthetists to preside at the head of the table, then that is the proper thing. I think in all of our deliberations on any branch of medicine we should bring ourselves back to this and only this criterion—what is best for the patient. None of us who labor in hospitals, even though it works a disadvantage to ourselves, must put ourselves in the light of profiteering for personal advantage.

So that the problem, I think, is this—who can best serve the surgical patient, a person who has given time and effort and study to the development of a specialty, or a person to whom anesthesia is more or less of a casual event.

Now I would not say that in this country there are not some highly skilled physicians who specialize in anesthesia. The development of anesthesia today can be traced to those doctors who have been interested and keen enough to study the whole problem. I am not advising supplanting that group of men who are specialists in anesthesia.

Now, what sort of training should this be? There are schools, in which the nurse anesthetist, or the applicant for training in anesthesia is simply told—"Here is the patient, there is the ether can; this is the way to do it." Too casual, too little supervision and, frequently, one observes a great inadequacy in didactic instruction.

Now I have a feeling that the person who seriously undertakes the study of anesthesia should have had a somewhat larger experience and training in physiology, anatomy and the various basic sciences than the average nurse receives. Whether the average nursing curriculum functions adequately in instruction in the basic sciences I somewhat doubt. I would recommend that the committee of your organization, which studies this problem should consider whether the average training course offers instruction in chemistry, in anatomy and in physiology which is adequate as a background for this specialty.

I have spoken of the necessity of an organized course from the standpoint of didactic talks. I believe that a fine mixture of practical experience and didactic instruction makes a more rounded course than either didactic instruction or practical experience alone. I fear that the tendency has been for a school to offer experience in giving four hundred ethers, or 297 gases rather than to offer a balanced course of lectures given by physicians, and the resident anesthetist, or perhaps by others in the hospital family. These scheduled lectures should be seriously undertaken by the physician and not just inserted as a duty between golf dates, as is frequently the case.

In other words, I contend that the acceptance on the part of any hospital of the responsibility for training persons of any grade carries along with it a moral responsibility for an unusual effort along those lines. The whole matter of training anesthetists must not remain the casual matter that it has in the past.

This is often true from the standpoint of the intern staff. Many of us who labor in hospitals, accept on the first of July, anywhere from a half a dozen to two or three dozen young interns. We are inclined to say, "Now, your service is in the men's medical ward, and this is the men's medical ward, and here is the intern that preceded you and he will tell you all about it. Now don't get into any trouble; you'll be punished if you do, and, now you're an intern." We expect too much from that intern. Any effort which is casual, which isn't seriously undertaken isn't likely to be well done and, of course, what is worth doing is worth doing well. Some day there are going to exist State regulations which require that if one opens a school of anesthesia, he must offer adequate practical experience, he must have a good teaching staff, he must follow an accepted curriculum. If anybody were allowed to accept pupil nurses with no state regulation of the school it would be chaos. If we were allowed to train pupils any way we wished some hospitals would require the scrubbing of beds nine hours a day and for the rest of the eighteen the care of patients or the serving of diets could engage their attention.

As this profession develops, first you need to prove to the professional world that you are proficient, that you are necessary, that you do your work well, that the patients are safe in the hands of the nurse anesthetists.

Second, some sort of educational standards, which require that the course shall be conducted for six months, or nine months, or three months;

that the lectures shall cover a definite curriculum; that those who enter this course shall have a certain preliminary training, and that the hospital which accepts such applicants for training, shall undertake a serious educational responsibility for the instruction of those applicants.

I am sure in my own mind that the properly trained—mind you, not the casual nurse anesthetist, or the casual intern anesthetist—I am sure that there is a place in our hospitals for you people. With a physician at the head of the department—not any physician but a real anesthetist, who instructs interns, and is responsible for the conduct of this specialty.

So, with a doctor at the head, enough resident anesthetists to assist in routine work and, if you are conducting a school, a curriculum upon which appears the names of the neurosurgeon, for brain anesthesia, the general and perhaps the nose and throat surgeon as well as others, for specialty anesthesia advice and instruction.

But above all, what are the standards of education for your profession? Until you reach some understanding on this point, nurse anesthetists will be trained improperly because hospitals are inclined to take the easiest way. Schools will spring up which have no right to exist, and nurses will be invited to come from the far reaches of the country, spending their time and money for an inadequate and improper, and inefficient type of instruction. And it isn't fair to the public for you to allow this to go on; it isn't fair to the public because I have an idea that as your profession progresses, as it emerges from this formative period, that possibly the result of the improvement in the methods of administering anesthesia will be reflected in the country's morbidity and mortality statistics.

I haven't told you a thing you didn't know, except I have appeared today and expressed my interest and approval and approbation of the trained nurse anesthetist.

## THE ROLE OF THE NURSE ANESTHETIST IN THE SURGICAL TEAM

By

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Throughout the ages men have accomplished illustrious deeds and made valuable contributions to the world of literature, art, science, history and religion, but it is doubtful if any proved a more serviceable gift to humanity than the discovery and eventful application of "Anesthesia." Although for thousands of years mankind had been searching for some means of abolishing pain produced by operations, it is less than one hundred years since surgical anesthesia became a demonstrated reality. Surgical anesthesia brought to an end one of the great tribulations that faced men in all ages. Its use in the last eighty-five years has made modern surgery possible. It has spared men more pain than that caused in all the wars of a century. We are deeply indebted to the men such as Long, Wells, Morton, Hickman and Warren for the great beneficent discovery, and every surgical operation in every hospital in every land should be a ceremony of triumph to their memory for these measures were brought into use against many obstacles of indifference and hostile application.

Not only was surgical agony abolished and the pains of childbirth eased, but the scope of operative treatment widened. The science of medicine was advanced to an incalculable degree. Rapid advancement in surgery has been made but not independently of other branches of medicine and during this rapid advancement there has been a great change in surgical diagnosis, operative technique and anesthesia. It is needless to review the history and development of anesthesia to its present day status. We are fully aware of the crude equipment and methods of application when anesthetics were first used, and the very unsatisfactory procedure of the administration inasmuch as anesthetics were for the most part administered by someone totally unequipped and unqualified and as a rule the surgeon had to deal with a different anesthetist each time he undertook an operation.

With few exceptions, the researches into the properties of the various drugs and gases employed for anesthetic purposes have been made by investigators in various special fields—physiologists, pharmacologists, chemists, et cetera, and not by those who administer anesthetics. To such investigators the progress in anesthesia is largely due, and to them should be given due credit and encouragement. The attempt however, to limit administration of anesthetics to certain groups of medical men only, has not been found possible or satisfactory in a great many hospitals. I think we all agree that the medical students or internes do not get sufficient time and experience to become proficient anesthetists.

We all know of the practice in hospitals in years gone by, of the inexperienced interne giving anesthetics. I say inexperienced, for so often they were students just leaving medical school where in all probability they were called upon to give an anesthetic only on rare occasions. They entered the hospital mainly to follow what they considered the more interesting side of professional work, and as a result the anesthetic service was shunned, or at best only accepted with reluctance. Consequently a very unsatisfactory condition of affairs ensued.

Having given my time to this particular work for a period of many years, I am convinced that it is a very good work for a graduate nurse to take up if she devotes her time to anesthetics only, for I am sure it is a task and a responsibility that needs undivided attention at all times.

Easy as it may seem at times to the bystander who looks upon the anesthetist as quiet, collected, unobserving of the surrounding disturbances, still it is a responsibility that no one can comprehend unless he has realized it through the actual experience. No matter how short an anesthetic or how minor an operation—no matter how good the condition of the patient may be previous to the operation, the anesthetist is dealing with the life of the patient in a condition where the least error in judgment may mean immediate death, a phase of the subject not sufficiently taken into consideration by those anesthetists who attempt to conduct an anesthetic and watch the operation at the same time.

Nobody realizes nor can realize what quick attention on the part of the assistants and nurses in anticipating the wants of the surgeon means to the anesthetist unless placed in her position. Every minute—yes—every second wasted for the want of promptness in assisting or preparing for an operation is an injustice to the unconscious patient who is thereby subjected to a more prolonged anesthetic which may mean a great deal to the welfare of the patient. Whether the case is an apparently simple or critical one does not alter the responsibility of the anesthetist. It should be remembered that the good anesthetist like the good surgeon is the one who besides being competent, has a conscience, and feels responsibility and who appreciates that there are those who are anxiously awaiting the outcome, and have a deep interest in the life that is in their hands.

I have learned through experience that a nurse who takes up this work as a specialty and devotes her entire time to it gradually wins the confidence of the surgeon, who I am sure is pleased not to have to deal with a different anesthetist every time he undertakes an operation. The surgeon, I am certain, feels that he is assuming a work and a responsibility great enough without having to give a part of his attention to the condition of the patient, or concern himself especially with the anesthetic. It surely must be a relief and a comfort to the surgeon to be able to rely upon the judgment of the anesthetist, to inform him when complications concerning the condition of the patient arise.

The anesthetist who regularly forms part of a surgical team knows the nature of the operation, is familiar with the operative technique in all cases, has the confidence of the surgeon and is well acquainted with the surgeon's characteristics. She follows the entire procedure through from the beginning and she knows the parts of anatomy that are sensitive and varies the anesthetic accordingly. She knows that it requires deeper anesthesia for rectal work than for a breast amputation and that upper abdominal surgery requires more profound anesthesia than is required in lower abdominal surgery. In this way she is able to lighten the work of the surgeon, and benefit the patient in combating surgical shock.

The physical condition of the patient should be learned and any indication for or against any particular method of anesthesia noted. The anesthetist should be aware of everything which an examination prior to the operation will reveal. She should make herself familiar with the general condition of the patient, and have all the available data possible as to the pulse, blood pressure, urinalysis, hemoglobin and coagulation time, et cetera. Any unusual condition, any abnormality in temperature, or colds, should not only be carefully observed, but reported to the surgeon, in order to render the most efficient service to the surgeon and the patient. Let us seek to make the patient as safe for surgery as surgery has been made for him. In spite of preliminary examinations, however, many situations cannot be anticipated before the operation which require management during this procedure and hence the importance of the anesthetist to be able to interpret signs and symptoms of anesthesia and to observe changes in the patient and advise the surgeon accordingly.

It is undeniable that the best team-work is displayed when the surgeon has a keen personal appreciation of the difficulties involved and during his work naturally defers to the judgment of his anesthetist. The surgeon may be ever so clever and skilled in using his scalpel in the operative field, but yet he must rely on the anesthetist to observe carefully and accurately any changes that may occur and furnish him with any necessary information regarding the patient's condition, and in doing so he feels that the patient is in safe hands, placing confidence in the anesthetists' ability.

The nurse anesthetist has had to meet with much criticism from the medical profession and many times referred to as "lay anesthetist," or relegated to the "realm of technician." It is not difficult to take a broad and unprejudiced view of this situation. We are entitled to a hearing on this question and to a thorough knowledge of any misunderstandings. We are frank in admitting our limitations of scientific knowledge regarding the principles of medicine. There is no need for a nurse to diagnose or prescribe.

How can we overcome and avoid these criticisms and objections? Some criticism may seem justified and based on well founded objections. There should be no cause for this criticism. Regardless of whatever differences of opinion may reasonably exist between those who advocate nurse anesthetists and those who think anesthetics should be given by physicians, we have reason to believe that the nurse anesthetist has come to stay and that there is an ever increasing appreciation of her value in the surgical team. We regret that we cannot always agree. We are, however, always ready for suggestions and constructive criticisms.

We feel that our part in the progress and success of the nurse anesthetist is to supply the best qualified person for this important place. It is imperative that anyone administering anesthetics should have a full knowledge of the signs and symptoms of anesthesia, and for that reason only qualified anesthetists who under supervision have demonstrated over a length of time their fitness should engage in this work. It is nevertheless with relief and satisfaction that we of the profession find ourselves, whatever the future may bring, recognized as essential in this work.

Nursing school standards have risen rapidly in the past years and the graduate nurse is becoming better educated and qualified to deal with the prevention of disease. It seems obvious that the nurse trained and educated to care for the patient throughout her years of training can do much for the patient's comfort and can help to allay or overcome the fear with which the average patient comes to the operating room. I am sure we all fully realize and appreciate what a tranquil mind means in taking an anesthetic.

An important characteristic of good anesthetists, be they doctors or nurses, is their interest in the study of human nature. In a little book entitled "Counsels and Ideals," from the writings of Dr. William Osler, we find these words: "Treat the patient, but don't forget his human side." The anesthetist must have sympathy for all. She must be patient with those who have had previous painful experiences, firm with the vacillating, businesslike with those who like efficiency, cooperative with those who are making a good fight, and diverting with children. If the confidence of the patient has been won and his fears abolished the induction and maintenance of anesthesia is facilitated and the recovery resembles normal sleep.

The "Nurse Anesthetist" marks an outstanding milestone of achievement and her value cannot be denied. How can we meet the need of the qualified nurse anesthetist? Let me enumerate some of the qualifications: She must possess keen power of observation which requires special study and special preparation. She needs all her faculties on the alert for the task of giving anesthetics, and she should possess power of discriminating judgment. She must know the signs and symptoms of anesthesia. In the face of present day trends, she must be versed in recent literature and keep abreast of the rapid changes. She must familiarize herself with the research phases of anesthesia.

Further may I say: Do not allow yourself to stagnate. Take time to go and see how others in similar positions meet their problems—broaden your point of view and become familiar with the larger problems of the work which you have selected.

It is unlikely that you will successfully play your part as a cog in a complicated machine without some knowledge of the construction of that machine and of the purpose for which it is operated. In reviewing some of the literature on anesthesia recently, I was quite interested in an article regarding the feasibility and eligibility of nurses giving anesthetics, reading as follows:

In 1921, the Council of the Ohio State Medical Association appointed a committee to investigate as to the choice of graduate physicians or graduate nurses in giving anesthetics. A questionnaire was sent out to 500 surgeons, the names being taken from the last directory of the American College of Surgeons, and to 400 hospitals, taken from the Directory of the A. M. A. Replies were received from a gratifying number of hospitals and surgeons, such as: A. J. Ochsner, Chicago; J. B. Deaver, Philadelphia; Chas. H. Frazier, Philadelphia; Howard A. Kelly, Baltimore; Hugh Cabot, Ann Harbor, Mich.; and many others.

May I quote briefly some of the replies:

1. "The anesthetist is merely an assistant in the operation, and it is no more logical that he be a graduate in medicine than to insist that all other assistants be medical graduates."

2. "The best anesthesias are conducted by women at the present time because it is possible to select women with the highest degree of intelligence and judgment for this work, while medical men possessing these qualities can almost never be induced to elect anesthesia as a specialty."

3. "Women make better anesthetists than men, and very much better than internes."

4. "We believe that the trained nurse, who after special training from six to twelve months under an expert anesthetist, demonstrates her proficiency and special ability, is entirely satisfactory and the best solution of the problem."

These replies must have been encouraging for the Nurse Anesthetist and a great stimulus to further develop this specialty.

In order to raise the standards of this specialty, may I make the plea for better and further preparation for this work. We must work for the betterment of the standards by the provision of improved facilities in recognized schools of anesthesia. Schools of anesthesia should show a satisfactory aptitude in mastering necessary details of information and technique. Let us have courses that will yield products not of good average quality, but of the highest quality. Schools should not be recognized without having presented clearly authenticated evidence of a certain period of training or a definite anesthesia course in an institution properly equipped and designed to furnish this post-graduate study. This in turn will require creation of teaching staffs of acknowledged efficiency. Standardized schools of anesthesia must be established. In them a definite anesthesia department is imperative. There cannot be divided responsibility. There must be correct and uniform teaching. A great deal more stress should be placed on the selection of the applicant for this specialty. Applicants must possess special qualifications that warrant choosing this work.

There is no thought to present through this paper detailed or even bare outlines of the content of studies that should be included in the curriculum of a modern school of anesthesia. This should be achieved through study and experimentation by the Educational Committee soundly prepared and in constant touch with the inevitable changes of this subject. This committee must go forward in an effort to straighten out the tangle in which schools are involved. The first and most urgent need of the Committee is a better measuring rod to be used in evaluating schools of anesthesia. A well balanced curriculum as it relates to the correlation of theory and practice is of great importance. I shall leave undefined the content of this curriculum but ultimately this must be determined.

As far as advising nurses to take up the work of anesthesia is concerned, I do not hesitate to say that I should not advise everyone in the nursing field to select this line of work, for I do not think that every nurse is capable of assuming this particular responsibility, for it means a mental strain at all times. I daresay that any conscientious anesthetist gives every anesthetic with a certain amount of timidity, for I know if I were to give anesthetics for the rest of my life I could never set about the task without being possessed of at least a degree of fear because of the responsibilities imposed by this position. As has been said before, it is always a question of life and death, and I sincerely hope that this fear and feeling will never leave me. I do believe it is the work of a graduate nurse if she is properly prepared and qualified for this responsibility and is willing to give herself up to this line of duty. As the graduate nurse comes to do this important work well, the medical profession generally will recognize her superior capability in this field of activity. I hope I have, in some measure, inspired the younger group of this specialty to continue their good work with increased enthusiasm.

Let us by unity of purpose and aim make the objects of this Association a reality and not a mere combination of words. Let us respect the advantages of organization that make it possible for us to achieve results. You are all co-workers in surgical relief. It is no trivial part you play in this service—yours is no mere accessory to scientific treatment. Organization promotes efficiency. We must have dynamic and effective leadership. There is much yet to be done—but in union there is strength. Let us remedy some of the most serious problems. We are encountering problems which must be solved—and only through cooperation can a solution be reached. Our earnest desire is to realize the fulfillment of our ideals.

Finally, I am of the opinion that in the not far distant future the graduate nurse in the capacity of anesthetist will become just as important a link in the surgical team as the surgeon's first assistant, and just because of woman's peculiar adaptability to this important work.

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# A NEWER METHOD OF COMPUTING THE INDIVIDUAL DOSAGE OF AVERTIN

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The trade name *Avertin* was given to a crystalline salt *Tribromethyl-alcohol*, synthetized by the German chemists Willstaetter and Duisberg. It was first used clinically as an anaesthetic in Germany in 1926, and in the United States two years later.

The drug is introduced into the body by rectum; commonly in a 2½ per cent solution with distilled water. For convenience in measuring, it is distributed in this country generally in liquid form, dissolved in amyline hydrate; 1 c.c. equalling 1 gm. of the salt. Amyline hydrate being readily volatile, care, of course, must be taken to prevent evaporation and consequent undue concentration of the more potent salt.

Avertin is not readily soluble in cold water, yet decomposes to a tissue irritant when overheated; 40 C. (104 F.) is the satisfactory and safe temperature for the preparation of the solution. The distilled water is measured and heated in a glass flask to this temperature; then the drug, very accurately measured in a 10 c.c. glass pipette, is added, the flask stoppered and shaken thoroughly. A small quantity of the mixture is then poured into a test tube and shaken with a drop or two of a 1 per cent aqueous solution of congo red, to detect the possible presence of hydrobromic acid, in which case a violet or blue color will result, instead of the neutral pink. With this color change, the solution must be discarded and a fresh solution prepared since in the presence of hydrobromic acid, the other component, *dibromacetaldehyde* is very irritant to mucous membrane, with the possible danger of causing a colitis or even ulceration of the colon.

Printed directions for preparation are included in each package of avertin. The technique can be readily learned and with proper attention to detail, the drug is satisfactorily stable. The solution is injected slowly into the rectum by means of a small, soft rubber catheter. The drug is absorbed quickly through the mucosa of the bowel, the patient usually passing very quietly and comfortably into a deep sleep.

Unlike the common inhalation anesthetics, Avertin is changed chemically in the body. Apparently it is broken up in the functional process of the liver, combining with glycuronic acid and it is so excreted by the kidneys. The rate of excretion depends largely on the rate of the body metabolism, which varies according to the age and state of health of the individual. This accounts for the recognized "high tolerance" for the drug of healthy children, young adults, and patients with toxic goitre, in comparison with that of the debilitated and elderly. Obese people of all ages are more readily depressed by this drug than those of normal weight, which, of course, is in keeping with the theory of the significance of the metabolic rate.

This brings me to the title of my paper. With each package of avertin solution there is a dosage chart computed on the basis of a maximum 100 mgm. of the drug per kilogram body weight. It is a very convenient chart, ranging usually in variations of 10 from 60 mgm. to 100 mgm. with a calculated quantity of water to make the 2½ per cent solution. It is so arranged that the dose may be readily adjusted according to the state of health, or debility of the patient.

Though a warning is given that the obese have a relatively low tolerance for the drug, and the maximum dose for women should not exceed 8 c.c., and for men 10 c.c., much is left to the judgment of the individual anesthetist, with always the possibility of over-dosage in inexperienced hands.

To offset this danger to a considerable degree, a dosage chart (Figure 1) was worked out at the New Haven Hospital, on the suggestion of the Surgeon-in-Chief, Professor Samuel C. Harvey, on the basis of surface area measurement. We have used this chart over a period of two years or more, for approximately 1,800 cases, and have found it very helpful.

In comparison with the original dosage chart, the dose of avertin is practically identical in both charts for patients of normal weight, in relation to their height; but for the abnormal, the difference in dosage is significant. For instance: for a patient of five feet, four inches in height, weighing 200 pounds, the maximum dose computed by surface area method would be 7.1 c.c., instead of 9.1 c.c., by the kilogram scale; a difference of 2 c.c.

Very little additional effort is involved in the use of the surface area method. The height as well as the weight of the patient must be ascertained, then with the DuBois chart (Figure 2), commonly used in computing the basal metabolism, the surface area is readily calculated.

Of course it is possible to train one's self to "size up" the patient, as to his variation from the normal in weight as well as to his general state of health, or the reserve, and measure the dose according to what he should weigh instead of what the scales say he does weigh; but individual judgment in the less experienced is more likely to err than accurately calculated measurement.

It is important to emphasize, however, that the age of the patient, his present physical condition, his susceptibility to depressant drugs, whether or not sedative premedication has been given, and the type of operation to be performed, should all be given intelligent consideration in determining the dosage, and not too much reliance placed on any form of fixed scale. We are dealing with a powerful drug to be injected into the body en masse, and, as the drug is evidently given off readily from the watery vehicle and rapidly absorbed, an overdose might easily get out of control.

Prolonged familiarity with this drug has impressed us with its value under conservative dosage. In the majority of cases we use the No. 3 scale, surface area, corresponding to the 80 mgm. per kilogram scale, for our maximum dose, with a preliminary hypodermic injection of morphine, gr. 1-6 (as an average), supplementing for major surgery with complete local anesthesia, or gas-oxygen inhalation. Muscular relaxation is markedly good, but pain impulses stimulate and counteract, to a considerable degree, the depressant effects of avertin.

From the standpoint of the patient, avertin anesthesia is ideal. The injection can be given to the patient in bed, and in his room or ward. After five to ten minutes he is ready to be transferred to the operating room, and though the occasional patient may seem to be conscious, he will probably have no recollection of anything further, pertaining to the operation, until he awakens in his bed, several hours later.

One of the great advantages of this method of anesthesia is this period of amnesia; another is the rarity of postoperative nausea or vomiting.

Under careful adjustment of dosage, there seem to be few conditions where avertin is definitely contraindicated. If the patient goes to sleep under the drug, we find there is practically always a fall of blood pressure, with a maintenance of pulse pressure, in relatively normal subjects, corresponding to the depth of narcosis. But the patient shows no gross appearance of shock; his face is slightly flushed; breathing is quiet, moderately slow, and regular; pulse normal or slightly accelerated; pupils contracted. On physical stimulation, such as being moved from bed to table, preparation of operative field, or pain from any cause, there is almost invariably an immediate, though possibly transient, rise in the systolic pressure.

Supplementary light gas-oxygen anesthesia, especially with rebreathing or addition of carbon dioxide, frequently is sufficient to raise an alarmingly low blood pressure to a satisfactory level, and maintain it.

Very rarely have we found it necessary to resort to drug stimulation. Hypertensive cases show a much more marked tendency to a fall of systolic pressure, and our practice is to be very conservative in the dosage for this type of patient.

It is our custom to take blood-pressure readings at 10-minute intervals—or more frequently—during the operative procedure; should the pressure be unduly low at the close of the operation, readings are taken for as much longer a period as is deemed necessary.

At the New Haven Hospital during the last four years avertin has been used, largely as a basal anaesthetic, for approximately 2,000 surgical cases. Frequently it has been given to a patient repeatedly, at intervals, for conditions requiring several operations. Its popularity has steadily increased with both patients and staff.

We have used this drug for practically all types of surgical procedures undertaken in the routine of a 400-bed general hospital, including an active neurological service. The age of the patients so treated has varied from 2 years to 74 years.

Our clinical findings with negroes under avertin anaesthesia have given us the impression that, as a whole, this class of patients has less tolerance for the drug than has the white race, though our experience in this respect is necessarily rather limited.

In no instance has serious complication or fatality resulted which it was felt could be ascribed to the use of this drug.

In view of the relaxing effect of avertin on the masseter muscles and the consequent danger of the tongue blocking the pharynx, emphasis should be given to the necessity of maintaining continuously a free airway while the patient is unconscious. When returned to bed he should, if possible, be placed well on his side and kept under close and intelligent observation.

The return of consciousness varies in length of time according to the tolerance of the individual for the drug, the size of the dose given, and the severity of the postoperative pain. As a rule a patient requires much less morphia, for the control of pain, during the first 24 hours following a major operation when avertin is used than when the anesthetic is limited to gas or ether.

I might add, that in addition to our use of avertin for general surgery, it has been employed on the pediatric wards for the control of convulsions in tetanus cases, with very good results. Five cases have been treated during the last three years; four of the patients recovered; one of these was given 31 doses of avertin over a period of two weeks. The fifth patient, a child of 3 years, was very toxic from the disease and died within 24 hours after admission to the hospital; the drug in this case had only slight quieting effect; further experience has proved the dosage given was insufficient, considering the toxemia present.

*Summary:*

(1) A dosage chart, computed on the basis of body surface area, is presented as a safer method than the usual "per kilogram" scale for determining the dosage of avertin for the individual patient; especially in reference to patients of relatively good health but of abnormal weight.

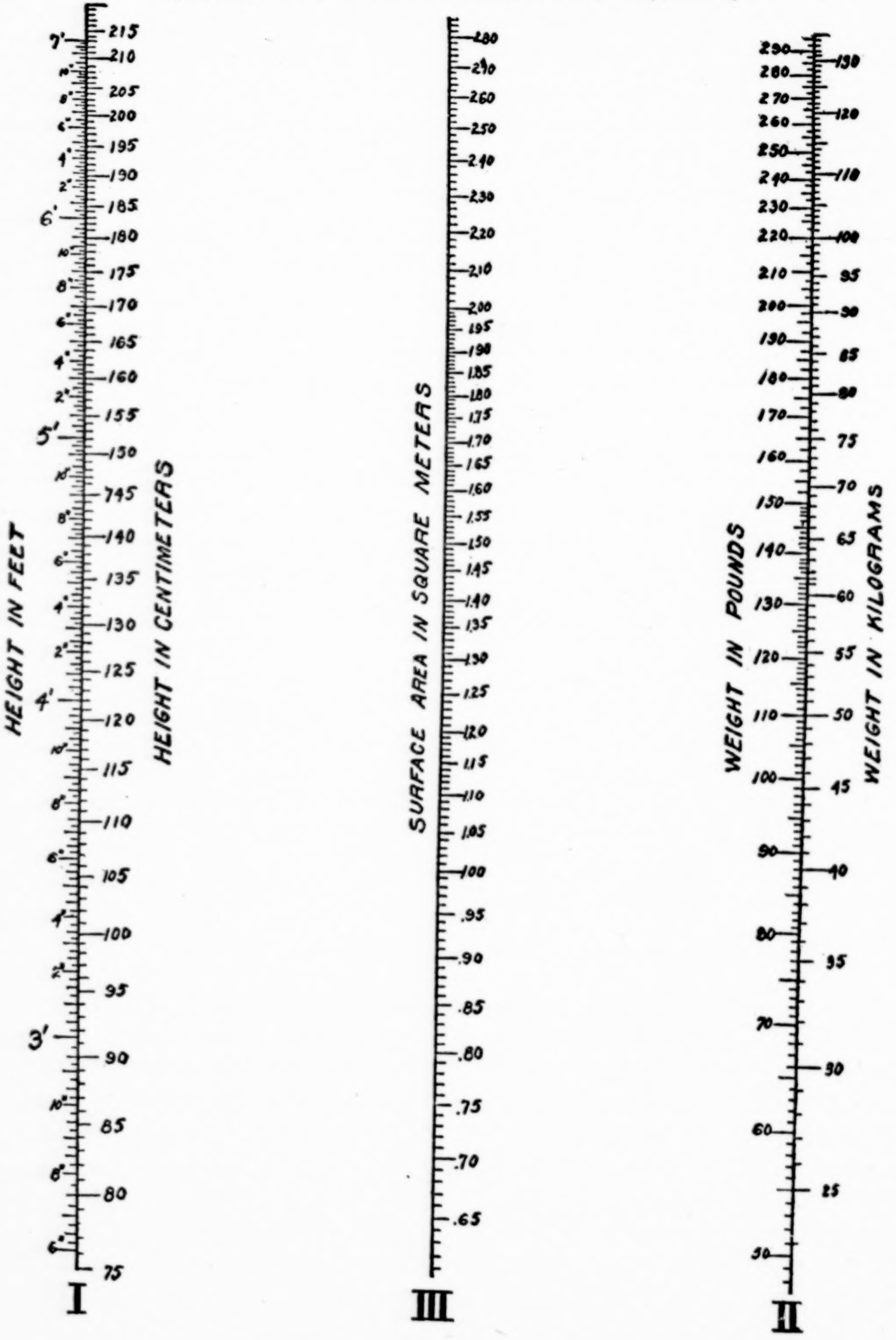
(2) A generalized report from one surgical clinic of approximately 2,000 cases of basal anaesthesia with avertin, giving evidence of the value and safety of this drug when skillfully dispensed and properly administered.

(3) Avertin as a valuable adjunct in the treatment of tetanus.

# TABLE "A"

## DUBOIS BODY SURFACE CHART

(As prepared by Boothby and Sandiford of the Mayo Clinic)



# AVERTIN DOSAGE TABULATED ACCORDING TO SURFACE AREA

| Patient's Surface Area in Square Meters | Dosage Table No. 1 362.5 mg. per 0.1 sq. meter | | Dosage Table No. 2 326.25 mg. per 0.1 sq. meter | | Dosage Table No. 3 290 mg. per 0.1 sq. meter | | Dosage Table No. 4 253.75 mg. per 0.1 sq. meter | | Dosage Table No. 5 217.5 mg. per 0.1 sq. meter | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Avertin in cc. | Water in cc. | Avertin in cc. | Water in cc. | Avertin in cc. | Water in cc. | Avertin in cc. | Water in cc. | Avertin in cc. | Water in cc. |
| 3.00 | 10.9 | 436 | 9.8 | 392 | 8.7 | 348 | 7.6 | 304 | 6.5 | 260 |
| 2.90 | 10.5 | 420 | 9.5 | 380 | 8.4 | 336 | 7.4 | 296 | 6.3 | 252 |
| 2.80 | 10.2 | 408 | 9.1 | 364 | 8.1 | 324 | 7.1 | 284 | 6.1 | 244 |
| 2.70 | 9.8 | 392 | 8.8 | 352 | 7.8 | 312 | 6.9 | 276 | 5.9 | 236 |
| 2.60 | 9.4 | 376 | 8.5 | 340 | 7.5 | 300 | 6.6 | 264 | 5.7 | 228 |
| 2.50 | 9.1 | 364 | 8.2 | 328 | 7.3 | 292 | 6.3 | 252 | 5.4 | 216 |
| 2.40 | 8.7 | 348 | 7.8 | 312 | 7.0 | 280 | 6.1 | 244 | 5.2 | 208 |
| 2.35 | 8.5 | 340 | 7.7 | 308 | 6.8 | 276 | 6.0 | 240 | 5.1 | 204 |
| 2.30 | 8.3 | 332 | 7.5 | 300 | 6.7 | 268 | 5.8 | 232 | 5.0 | 200 |
| 2.25 | 8.2 | 328 | 7.3 | 292 | 6.5 | 260 | 5.7 | 228 | 4.9 | 196 |
| 2.20 | 8.0 | 320 | 7.2 | 284 | 6.4 | 256 | 5.6 | 224 | 4.8 | 192 |
| 2.15 | 7.8 | 312 | 7.0 | 280 | 6.2 | 248 | 5.5 | 220 | 4.7 | 188 |
| 2.10 | 7.6 | 304 | 6.9 | 276 | 6.1 | 244 | 5.3 | 212 | 4.6 | 184 |
| 2.05 | 7.4 | 296 | 6.7 | 268 | 5.9 | 236 | 5.2 | 208 | 4.5 | 180 |
| 2.00 | 7.3 | 292 | 6.5 | 260 | 5.8 | 232 | 5.1 | 204 | 4.3 | 172 |
| 1.95 | 7.1 | 284 | 6.4 | 256 | 5.7 | 228 | 4.9 | 196 | 4.2 | 168 |
| 1.90 | 6.9 | 276 | 6.2 | 248 | 5.5 | 220 | 4.8 | 192 | 4.1 | 164 |
| 1.85 | 6.7 | 268 | 6.1 | 244 | 5.4 | 216 | 4.7 | 188 | 4.0 | 160 |
| 1.80 | 6.5 | 260 | 5.9 | 236 | 5.2 | 208 | 4.6 | 184 | 3.9 | 156 |
| 1.75 | 6.3 | 252 | 5.7 | 228 | 5.1 | 204 | 4.4 | 176 | 3.8 | 152 |
| 1.70 | 6.2 | 248 | 5.5 | 220 | 4.9 | 196 | 4.3 | 172 | 3.7 | 148 |
| 1.65 | 6.0 | 240 | 5.4 | 216 | 4.8 | 192 | 4.2 | 168 | 3.6 | 144 |
| 1.60 | 5.8 | 232 | 5.2 | 208 | 4.6 | 184 | 4.1 | 164 | 3.5 | 140 |
| 1.55 | 5.6 | 224 | 5.1 | 204 | 4.5 | 180 | 3.9 | 156 | 3.4 | 136 |
| 1.50 | 5.4 | 216 | 4.9 | 196 | 4.4 | 176 | 3.8 | 152 | 3.3 | 132 |
| 1.45 | 5.3 | 212 | 4.7 | 188 | 4.2 | 168 | 3.7 | 148 | 3.2 | 128 |
| 1.40 | 5.1 | 204 | 4.6 | 184 | 4.1 | 164 | 3.6 | 144 | 3.1 | 124 |
| 1.35 | 4.9 | 196 | 4.4 | 176 | 3.9 | 156 | 3.4 | 136 | 2.9 | 116 |
| 1.30 | 4.7 | 188 | 4.2 | 168 | 3.8 | 152 | 3.3 | 132 | 2.8 | 112 |
| 1.25 | 4.5 | 180 | 4.1 | 164 | 3.6 | 144 | 3.2 | 128 | 2.7 | 108 |
| 1.20 | 4.3 | 172 | 3.9 | 156 | 3.5 | 140 | 3.0 | 120 | 2.6 | 104 |
| 1.15 | 4.2 | 168 | 3.8 | 152 | 3.3 | 132 | 2.9 | 116 | 2.5 | 100 |
| 1.10 | 4.0 | 160 | 3.6 | 144 | 3.2 | 128 | 2.8 | 112 | 2.4 | 96 |
| 1.05 | 3.8 | 152 | 3.4 | 136 | 3.0 | 120 | 2.7 | 108 | 2.3 | 92 |
| 1.00 | 3.6 | 144 | 3.3 | 132 | 2.9 | 116 | 2.5 | 100 | 2.2 | 88 |
| 0.95 | 3.4 | 136 | 3.1 | 124 | 2.8 | 112 | 2.4 | 96 | 2.1 | 84 |
| 0.90 | 3.3 | 132 | 2.9 | 116 | 2.6 | 104 | 2.3 | 92 | 2.0 | 80 |
| 0.85 | 3.1 | 124 | 2.8 | 112 | 2.5 | 100 | 2.2 | 88 | 1.8 | 72 |
| 0.80 | 2.9 | 116 | 2.6 | 104 | 2.3 | 92 | 2.0 | 80 | 1.7 | 68 |
| 0.75 | 2.7 | 108 | 2.4 | 96 | 2.2 | 88 | 1.9 | 76 | 1.6 | 64 |
| 0.70 | 2.5 | 100 | 2.3 | 92 | 2.0 | 80 | 1.8 | 72 | 1.5 | 60 |
| 0.65 | 2.4 | 96 | 2.1 | 84 | 1.9 | 76 | 1.6 | 64 | 1.4 | 56 |
| 0.60 | 2.2 | 88 | 2.0 | 80 | 1.7 | 68 | 1.5 | 60 | 1.3 | 52 |
| 0.55 | 2.0 | 80 | 1.8 | 72 | 1.6 | 64 | 1.4 | 56 | 1.2 | 48 |
| 0.50 | 1.8 | 72 | 1.6 | 64 | 1.45 | 72 | 1.3 | 52 | 1.1 | 44 |

NEW HAVEN HOSPITAL

# CLINICAL EXPERIENCES WITH PENTOBARBITAL

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The use of pentobarbital on the surgical service of the University Hospitals of Cleveland is increasing, and is being used in 65 to 70 per cent of all the premedicated cases. The age of the patients in this series varied from three months to eighty-one years. The operative procedures were grouped as to region in series of percentage: as—head, 3; face, 8; neck, 10; chest, 9; breast, 6; back, 1; abdomen, 18; pelvis, 22; and extremities, 18.

Premedication with pentobarbital varies with the general condition of the patient, the nature of operation, and the supplementary anesthetic to be given. In seventy per cent of the series the procedure was as follows: 1½ grs. of pentobarbital was administered in capsule on the evening preceding the operation in order to assure a restful night. The following morning, two hours before the scheduled operation 1½ grs. of pentobarbital was given and followed in an hour by another grs. 1½, or perhaps 3 grs. (as indicated) with 1-6 gr. morphine and 1-150 gr. atropine, given hypodermically. The total dosage of the hypnotic administered on the morning of operation was 3 grs. or less in 52 percent, and 4½ to 9 grs. in the remaining 48 percent of cases. Morphine 1-4 gr. was usually administered in combination with smaller dosages of the hypnotic only when indicated by the condition of the patient, or by the nature of the surgical case. Gall bladder and thyroid cases reacted better to large than small dosages.

On arrival at the operating room, 68 percent of the patients were drowsy and uninterested in any procedure; 24 percent were asleep, and 8 percent were inebriated and moved when disturbed. One out of five patients showed slight congestion of the conjunctiva, as in the avertin series.

The respiratory volume (measured with a Bohr gas meter before and after medication) was decreased somewhat by the pentobarbital. Morphine gr. 1-6 alone occasionally slightly increased but usually decreased the volume three to five percent. Medication with morphine gr. 1-6, pentobarbital grs. 3 showed a two to seven percent depression. With morphine gr. 1-6, pentobarbital 4 to 7 grs., an eight to sixteen percent decrease was shown.

Patients receiving 3 grs. of pentobarbital or less showed a pulse rate varying from normal to a 75 percent either plus or minus.

The blood pressure change from normal was independent of the dosage of hypnotic given. There was usually a decrease if patients were asleep. The rise was most frequently observed in patients under 40 years of age, and a fall of five to ten percent occurred in patients more than 59 years of age.

The period of induction (from three to five minutes) was uneventful, independent of the nature of the anesthetic supplement, and the quantity of anesthetic used was much less than the amount required with morphine alone. The *respiratory depression* was not as apparent with pentobarbital as with avertin, unless six to nine grs. of pentobarbital were administered or morphine gr. 1-4 given with smaller doses of pentobarbital.

During the operation gas mixtures containing larger percentages of oxygen were sufficient to maintain a good color as well as surgical anesthesia. Eighty-five to 96 percent of the anesthesias with pentobarbital were considered good and the remainder fair. Poor anesthesias were rare. Gynecological and gall bladder cases reacted least satisfactorily to pentobarbital doses of 3 grs. and nitrous oxide and oxygen. It therefore was necessary to increase the premedication or add ether to the gas mixture. The patients from one to 40 years of age reacted most satisfactorily, while those over 60 least satisfactorily. The reaction of cerebral cases to large doses of pentobarbital and local anesthesia was excellent.

The respiratory rate during anesthesia increased 30 to 60 percent, with a slight decrease in volume. There was only a change of 15 to 20 percent with the local cases. There was no apparent change in respiration in the gall bladder or thyroid series. Those cases appear most tolerant to heavy premedication.

The pulse rate increased 15 to 27 percent during nitrous oxide-oxygen anesthesia. The pulse rate was within 5 percent of normal during nitrous-oxide-oxygen and ether anesthesia. During local anesthesia there was no apparent change. Post-operatively the pulse rates fell toward normal and with aged patients was from 5 to 15 percent below normal. The gall bladder group showed a rise of 30 to 50 percent and remained 15 to 35 percent above normal post-operatively.

Pre-operatively there was only a two to 10 percent fall in the systolic pressure. This was thought to be due to the physical state of the patient, individual variation or to the hypnotic dosage given. During anesthesia the pressure increased according to the anesthetic supplements used, in the following order: gas oxygen—gas oxygen plus ether—local and ether. The systolic pressure remained unchanged or rose slightly toward normal during anesthesia, and diminished 13 to 22 percent below normal post-operatively.

The diastolic pressure pre-operatively showed a reaction of 10 percent increase. During anesthesia the diastolic change was greater in degree, and this was probably due to the moderate anoxemic factor. Under ether anesthesia, the fall in diastolic pressure exceeded that of the systolic pressure. Post-operatively the diastolic pressure fell 5 to 10 percent below that noted pre-operatively. The diastolic changes noted in the brain group differed from those of other cases in that the pressure increased to a much greater degree, and remained 20 percent above normal during the post-operative period, in contrast to the negligible systolic variations which were observed.

Undesirable reactions were observed in five cases pre-operatively, and in seven cases post-operatively. In one case the pulse became imperceptible, and in the others there was a fall in blood pressure of marked degree. Four of the five cases received morphine and hyoscine with pentobarbital. Three were treated with ephedrine gr. ¾ during the operative procedure but all returned to their beds in good condition. During the post-operative course a marked fall in blood pressure occurred in four patients. Two were in shock and required treatment. Cyanosis was observed in three patients, during the course of anesthesia,. The color was controlled by increasing the oxygen percentage and the operative procedure not interrupted.

Twenty to forty percent of the patients medicated with pentobarbital were very restless and required restraint. The frequency was greater with young and least with aged patients. This decreased with increased dosages of the hypnotic and was entirely absent with maximal dosages. The restlessness also depended to a large degree on the nature of the supplementary anesthetic. Thus the order of frequency greatest to least was: ether—gas plus ether—gas-oxygen plus local anesthesia. The gall bladder and thyroid patients were more restless than other surgical cases.

The duration of post-operative sleep with pentobarbital varied from a few minutes to 10 hours. The dosage of the hypnotic, nature of the anesthetic supplement, period of operation and severity of the surgical procedures, were considered. The lethargic individuals invariably slept longer than excitable patients. Sex seemed to make no difference as to the dosage of pentobarbital, while the condition of the patient had first consideration, and age was of secondary importance. For example, the youngest patient (3 months of age) in the series was medicated with 1 gr. of pentobarbital, while a 50-year old patient weighing more than ten times as much as the infant, received 3 grs. Both patients were subjected to the same operative procedure and supplementary anesthetic, with equally satisfactory results.

Complete amnesia occurred in a period of five to eight hours in one-third of patients medicated with 1 to 3 grs. of pentobarbital. The amnesia began 10 to 30 minutes after the administration of the capsule. In 30 percent of the patients there was a confusion of memory and in the remaining 40 percent there was no amnesia. Amnesia was complete in 75 percent of the cases that received 5½ grs. or more of the hypnotic and lasted from 9 to 12 hours. The remaining 25 percent had an imperfect memory for several hours. Those receiving 9 to 10 grs. of the drug slept from 8 to 16 hours and were difficult to arouse.

The frequency of nausea in patients receiving pentobarbital and supplemented with ether was four times as great as those getting nitrous oxide plus ether, altho the premedication was the same.

Nausea occurred in 11 percent of the thyroid cases but no emesis. Ten to 18 percent of the gynecological cases were nauseated but less than 10 percent vomited post-operatively. Emesis was observed in but one brain case—never nausea. The gall bladder patients presented nausea and emesis most frequently, which was probably due to the nature of the organic disturbance.

Albumin was found in 10 percent of the catheterized specimens post-operatively. The urine output was reduced according to the water intake. Casts were rarely observed post-operatively. The albumin and casts noted were more frequent with the gall bladder and thyroid groups and with aged patients.

## SUMMARY

1. Pentobarbital and morphine eliminates apprehensiveness and renders the patient asleep or uninterested in anesthetic or surgical procedure in operating room.

2. Induction is shorter and smoother. Anesthesia is maintained with smaller doses of the supplementary anesthetic.

3. Respiratory disturbances occur more frequently with maximal doses of the hypnotic in the presence of morphine, and occasionally the maintenance of a satisfactory color necessitates an increase in the oxygen percentage of anesthetic gas mixtures as ordinarily used.

4. The pulse rate increases 10 to 25 percent during anesthesia and decreases post-operatively. The gall bladder and thyroid patients have greater pulse changes than other surgical cases. The minimal changes are in the aged and maximal in the young patients.

5. A rise of 5 to 10 percent above normal is noted in the blood pressure in most cases, while in a few cases there is a minus 10 to plus 25 percent noted. The brain group usually have a blood pressure below normal during the operation. The post-operative pressure falls from the level maintained during anesthesia.

6. The duration of sleep shows a close correlation to the nature of the patient; as: the general condition, metabolic level and nervous stability. Age appears to be of importance—the susceptibility is in order from greatest to least (the immature age group, 1 to 16 years; aged, over 60; the 40 to 60 years group; and the least with the 19 to 40-year age group).

Caution should be noted if over 9 grs. are administered, even when given in divided doses, especially if given with morphine. The patients sleep from 8 to 16 hours, and are difficult to arouse. Morphine gr. 1/4 should be used cautiously if over 5 grs. of pentobarbital have been given, because of the occasional sensitivity of patients and the greater tendency of such medication to result in respiratory depression.

7. Large dosages of pentobarbital are indicated in cholecystectomies and lobectomies. Morphine gr. 1/4 is best used with the cholecystectomies.

8. In 75 percent of the patients medicated with 3 or more grs. of the hypnotic there is an amnesia following the administration and lasting 4 to 14 hours post-operatively.

9. There are no renal effects of the hypnotic observed.

10. Morphine controls the gall bladder and thyroid cases that are more restless post-operatively than other types or cases. Twenty to 40 percent of the patients are somewhat restless. This decreases with the increasing dosages of the hypnotic. The frequency is least with aged and greatest with young patients.

11. Post-operative complications are rarely observed.

# "PRE-ANAESTHETIC DRUGS MOST COMMONLY USED IN THE SOUTHWEST"

C. Virginia Godbey, R. N., Chief Anesthetist
W. I. Cook Memorial Hospital, Fort Worth, Texas

The anaesthetist's position is one of considerable responsibility, and we should acquire a thorough knowledge of the action of synergistic drugs as aids to anaesthesia. We are confronted with many problems in the execution of our specialty. We see many phenomena as we carry a patient from consciousness, often accompanied by profound fright, to the stage of surgical anaesthesia.

Our first consideration is the patient. Quite often the patient regards the ordeal of an anaesthesia and operation with a great degree of apprehension. Apart from the effect of the disability from which he is suffering, these natural fears reduce the powers of resistance to the operative shock, and thus retard his recovery. It is, therefore, important to assure the patient a quiet night of sleep and rest, free from worry. In order to do this, it is desirable to have the patient admitted to the hospital the evening before the operation. This has a three-fold advantage. First of all medication can be carefully recorded and the action of the drugs noted, particularly upon respiration, and the depth of narcosis produced. In this way the morning dosage of pre-anaesthetic medication can be judged more accurately. Second, the patient has an opportunity to become acquainted with his surroundings and with the people who will have the care of him during recovery. Third, the forcing of fluids before operation is made possible. This, to my mind, cannot be stressed too strongly.

Today we are employing more and more drugs of the hypnotic group for premedication. Although these drugs, employed alone in the doses we use, have little effect on the perception of pain, yet they definitely decrease the amount of the supplementary anaesthetic and make the anaesthesia less difficult to produce and, for the patient, much less alarming.

The primary value of synergists is to deepen or increase the effect of the anaesthetic rather than to prolong the narcosis. More work is being done to perfect an ideal premedicating agent than in any other department of anaesthesia research. It is universally regarded as being the pivotal refuge of smooth safe anaesthesia.

The use of the barbituric acid derivatives and of tribromethanol as basal anaesthetics has become popular and wide-spread in the Southwest, apparently because they may be administered to the patient in his room, and also because they so depress his central nervous system that he is often not conscious of being transferred from the ward to the operating room.

Although some consider prolonged postoperative depression an advantage, prompt recovery from anaesthesia following an operative procedure is always a desirable factor. Due to idiosyncrasy, faulty elimination, or over-dosage of the hypnotic agent, many patients present a delayed recovery which sometimes becomes alarming.

In using the hypnotics, it seems more desirable to give them in divided doses and to supplement them by one of the more commonly used opiates. In making this survey, it was surprising to learn that less than one half of the hospitals and surgeons were using the hypnotic drugs along with the opiates routinely, in most instances owing to the extra expense of the drugs.

The barbital group of hypnotics has become increasingly popular because of the combined effects as hypnotic-analgesics, motor depressants, and pre-anaesthetic narcotics. The moderate doses act in from fifteen minutes to one half hour; the effects last from four to eight hours after the patient passes into a natural sleep.

The chief action of the barbital group is exerted upon the basal ganglia, whereas effects of opiates are believed to be exerted upon the cerebral cortex. The barbiturates are credited with interrupting afferent impulses before they reach the cerebrum. Basal metabolism and temperature are somewhat lowered even in therapeutic doses. Therapeutic doses do not affect the vital centers in the medulla, but following toxic amounts the respiratory and vagus centers are markedly depressed.

We have used a wide variety of the hypnotics in our clinic during the past six years, but at the present time we are using alurate, veronal, nembutal, and luminal—each surgeon having his own preference.

Amytal is being used most generally by the majority of the hospitals and surgeons, and the dosage varies from three to eighteen grains. Usually the bedtime dose is three grains, and is repeated if the patient does not quiet down into a restful sleep at the end of an hour. The morning dose of three to six grains is given from two to one hour before the time the operation is scheduled and repeated if the narcosis is not complete, followed by morphine, gr. 1-6 to 1-4, with atropin, gr. 1-150, thirty minutes before the patient is transferred to the operating room. We have given as much as thirty-five grains of veronal before operation but found the majority of the patients had a badly depressed respiratory action. Nembutal, alurate sodium, ortal sodium, and luminal sodium were used by the majority in doses of three to nine grains. The bedtime dose is three grains and repeated two hours before operation and one hour, followed by morphine sulphate, gr. 1-6 to 1-4 with atropin, gr. 1-150, thirty minutes before the patient is transferred to the operating room.

Some surgeons are using pantopon instead of morphine and like it better because of the absence of postoperative nausea.

In my opinion, from the standpoint of the anesthetist, the choice of the hypnotics at the present time would be nembutal and alurate, giving three grains at bedtime and repeating one hour before operation, following thirty minutes later with morphine, gr. 1-6, and atropin, gr. 1-150.

When the smaller dosage of the hypnotic drug is used, the patient has less respiratory depression. The body weight and physical condition of the patient are big factors in choosing any hypnotic or narcotic as a preoperative medication.

In conclusion, I feel that pre-anaesthetic medication should be given because it helps to guide our patients safely and quietly over the early exciting symptoms of anaesthesia induction.

# AVERTIN

Kathleen Sturgeon, R. N., from the Department of Anesthesia
University of Michigan Hospital, Ann Arbor, Mich.

Tribromethanol, more commonly known as Avertin, was produced by Willstaetter and Duisberg in 1925. Eicholz demonstrated its anaesthetic properties in 1927.

Chemically, it is a white crystalline substance which is soluble in water at 104° Fahrenheit, but is available only as avertin fluid. This is a solution of avertin in amylene hydrate, which dissolves avertin in high concentration, and is itself readily soluble in water. Each cubic centimeter of fluid contains one gram of avertin. It is used in a three percent solution, made up with distilled water at a moderate temperature—95° Fahrenheit to 104° Fahrenheit. At a higher temperature, hydrobromic acid and dibromacetaldehyde are produced, which cause marked irritation and sometimes necrosis of the intestinal mucous membrane.

At the University Hospital, avertin is used as a basal anaesthetic in doses of eighty to one hundred and ten milligrams per kilogram. The dosage rate depends on the patient, children and young adults requiring more and the elderly and obese less avertin. For preoperative preparation, an enema is given the evening before the operation. This is sometimes repeated in the morning, but is not absolutely necessary. A mild sedative may be given the evening before to insure the patient a good night's rest, and a sedative is usually given in the morning. The avertin is given slowly as a retention enema, requiring three to five minutes. About thirty minutes before the operation is scheduled, the avertin is administered in the patient's room, which is quiet and darkened to facilitate the action of the drug. There is no excitement stage and in five minutes or less the patient falls into a natural sleep. The blood pressure is taken before the anaesthetic is given and every five minutes thereafter. The air passages must be kept open as the jaw relaxes early. Ordinarily there is no cyanosis, but should there be, it is readily cleared with oxygen and carbon dioxide. The supplementary anaesthetic, consisting of nitrous oxide oxygen, ether or local, depending upon the nature and location of the operation, should be started in the anaesthetic room. The skin remains warm and dry and the patient perspires very little. Respirations are quiet, and the heart apparently is not affected, the pulse remaining nearly normal. There may be a drop of ten to thirty millimeters in blood pressure. In some cases the drop has been more marked, but without apparent shock. The pressure may rise when the operation is started. When necessary, caffeine sodium benzoate grains seven and one-half or ephedrine sulphate grains three-quarters are effective as stimulants. The anaesthetic lasts one and one-half to three hours. During the first twenty minutes, eighty percent of the avertin is absorbed and ninety to ninety-five percent in the first two hours. When the operation is finished and the remaining solution removed, a saline irrigation is given and a pint of warm normal saline is allowed to remain in the rectum. We give caffeine sodium benzoate grains seven and one-half routinely at the close of the operation as we believe it helps shorten the reaction time. Some patients react immediately, others in one-half to three hours, depending on the dosage of avertin and the length of the operation. Should the patient have depressed respirations, carbon dioxide ten percent and oxygen ninety percent given every half hour is beneficial.

Avertin is detoxified in the liver through formation of a compound with glycouronic acid, and is excreted mainly through the kidneys. Consequently, its use is contra-indicated in people with diseases of the liver. It has been stated that it is contra-indicated in diseases of the kidneys but experience at the University Hospital has demonstrated that there is little, if any, effect upon the kidneys. It is also contra-indicated in advanced pulmonary tuberculosis, because it depresses the respirations and may abolish the cough reflex. In the Department of Thoracic Surgery avertin is used only occasionally because Dr. Alexander is very anxious in most of his cases to have the cough reflex reestablished as soon as possible after the completion of the operation.

It has been used extensively in most branches of surgery as it requires less inhalation anaesthesia, gives good relaxation, and the respirations are quiet. For operations about the face and neck it is desirable because it allows more room for the surgeon. In thyroidectomies patients are usually very nervous and apprehensive and with avertin this is overcome, making thyroid steals very simple. In the dosage used, the reflexes remain, but the patient sleeps at long intervals during the twenty-four hours following the operation and has complete amnesia. It is excellent for children, since the drug is given as a small enema and in a very short time the child falls into a natural sleep, without the knowledge of the impending operation.

The Department of Neurological Surgery at the University of Michigan Hospital, under the direction of Dr. Max Peet, used avertin before it was generally available five years ago, and has been using it consistently since that time. It is of special value in this branch of surgery, because it does not alter the intra-cranial pressure, and the venous bleeding is no more than with local anaesthesia. In cerebellar tumor operations, the quieter breathing induced by avertin is a valuable asset. The prolonged duration of avertin anaesthesia is desirable in most neurological operations. In most cases we insert an intratracheal catheter to eliminate any respiratory difficulty.

Of four hundred and thirty cases in general surgery reviewed by Dr. Henry Ransom, it is interesting to note the amount and type of supplementary anaesthetic: In 30.23% no supplement was necessary; in 57.21% nitrous oxide oxygen was used, being the anaesthetic of choice; in 7.68% nitrous oxide oxygen and ether vapor; while in 4.88% ether alone was used. Since this review, we have discontinued attempting to get complete surgical anaesthesia and all cases are supplemented. At the conclusion of the operation in Dr. Ransom's series, the surgeon was requested to state his opinion of the anaesthetic in that particular case. In 86% the anaesthetic was recorded as entirely satisfactory, while in 14% it was thought to be only fair or poor. Post operative nausea and vomiting were absent in 62%, while in 38% there was some nausea and vomiting which may have been due to the operation itself rather than the anaesthetic. In the entire four hundred and thirty cases, there was no report of any rectal irritation or ulceration and no complaints of rectal pain, discomfort or bleeding following avertin anaesthesia, which was probably due, at least in part, to the care used in its preparation. There is no evidence that repeated avertin anaesthetics have adverse after-effects. One patient had nine avertin anaesthetics during one year for plastic operations, while another with gall stones (a woman who refused operation) had six doses of avertin within two weeks for control of intolerable pain.

Of the four hundred and thirty cases, there were four patients with complications possibly due to anaesthesia: one herniorrhaphy case developed pneumonia on the second post-operative day; one spinal fusion case developed pleurisy on the second day; one cholecystectomy and appendectomy case developed bronchitis the third day. There was only one death in the total series, which could be attributed to avertin. The operation was an exploratory laparotomy for carcinoma of the stomach, which proved to be inoperable. The patient left the table in satisfactory condition, but died suddenly five hours later. The autopsy showed intense pulmonary edema.

In gynecology, avertin is used quite generally for elderly women who require long anesthetics. In laparotomies avertin and nitrous oxide oxygen give relaxation similar to that obtained by deep ether anaesthesia. Three hundred consecutive cases, consisting of one hundred and seventy-two laparotomies and one hundred and twenty-eight vaginal operations, were reported by Dr. Peterson and Dr. Pierce. 62% of these received avertin only; 36.66% avertin and nitrous oxide oxygen; while the remaining 1.33% received avertin and ether. The maximum dose in this series was 110 milligrams per kilogram and the minimum ninety milligrams per kilogram. There were no post operative complications due to the anaesthetic, no rectal irritation, liver damage or pneumonia was encountered. There were no deaths in this series. In normal obstetrics, avertin has not been used very extensively. In eclampsia, we have had excellent results. No detailed report has been made but patients who have had from one to five convulsions before admission were given avertin doses of seventy to ninety milligrams per kilogram as soon as possible after admission. The patients became unconscious and had no more convulsions. Labor was induced and the patients delivered normally without further difficulty.

Avertin is used quite extensively in most branches of surgery at the University of Michigan Hospital with uniformly satisfactory results. It is felt that many of the objections to other anaesthetics are avoided, and it has many desirable features with no greater, and possibly less, danger than most other anaesthetics.

REFERENCES:

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|---|---|
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| Henry Ransom, M.D., F.A.C.S. | Archives of Surgery<br>January, 1933, Vol. 26, pp. 89-102 |

# CLINICAL IMPRESSIONS OF DIVINYL ETHER

R. Margaret Kramlich, Chief Anesthetist
University of Pennsylvania Hospital, Philadelphia

Within the last fifteen to twenty years there has been a change in the status of anesthetics. From the standpoint of the patient, the surgeon, and the anesthetist, there is good evidence that the ideal anesthetic has not been found.

Pure divinyl ether is a clear, colorless liquid. It is as explosive and inflammable as diethyl ether, and is more volatile. Divinyl ether has a not unpleasant etheral odor, and when pure is not as pungent, or as irritating as diethyl ether.

According to the studies on the Dog made by S. Goldschmidt, I. S. Ravdin and B. Lucke, the average concentration of vinyl ether in the blood between the anesthetic concentration (point of disappearance of corneal reflex) and the point of respiratory failure is the ratio of 28 to 68. These findings indicate that the anesthetic potency of vinyl ether is approximately 4 times that of ethyl ether. In the human the concentration of vinyl ether in the blood (at the point of disappearance of the corneal reflex) averages 18.21%. Published data of the concentration of chloroform in the blood at a similar stage of anesthesia gives an average of of 37½ percent. The comparative potency of vinyl ether to chloroform is therefore about 1 to 1.3.

Divinyl ether has been administered in the Hospital of the University of Pennsylvania to approximately 1000 patients, not including its use as an induction to ethyl ether in about 800 cases.

It can be given in one of three ways—open drop, closed volatilization with oxygen, and in combination with nitrous oxide and oxygen.

The open drop method was used in most of the cases. When this method was used, several loose layers of gauze were placed over the patient's face after the eyes had been covered with moistened gauze. The anesthetic was dropped slowly from a bottle while the anesthetist talked to the patient. In the remainder of the series it was administered in conjunction with nitrous oxide and oxygen, the divinyl ether being placed in the ether reservoir. When given by this method, only a very small amount should be used since rapid bubbling of the oxygen through the divinyl ether results in too high a concentration of the anesthetic in the inspired gas.

The ages of the patients varied from 5 months to 82 years. The anesthetic was so well tolerated by children, that we have used it extensively in this group for general surgical and otologic operations. The weights of the patients varied from a few pounds to 275 pounds, and the physical make-up was of the variety encountered in any surgical clinic.

The conditions for which anesthesia was induced were extremely varied. It was used for thyroidectomy, gastrostomy, gastro-enterostomy, appendicectomy, herniorrhaphy, mastectomy, nephrectomy, for operations for tic douloureux, brain abscess, and middle ear disease, and for operations on the soft parts and bony skeleton. With the exception of two operations for cholecystectomy, the anesthetic was not used for operations on the biliary tract.

It is difficult to describe the effect of divinyl ether in terms of the classic stages of anesthesia. The first stage is as a rule, extremely short, so short, in fact, that consciousness is often completely lost after a few inhalations. Thus, the picture of analgesia without loss of consciousness, which is seen in the more commonly used inhalation anesthetics is only rarely observed. The laryngeal reflexes, which are often irritated when diethyl ether is used are rarely observed with divinyl ether.

Guedel has pointed out that there is a light stage of surgical anesthesia which affords the surgeon as much ease and comfort in operating as the state of deepest third stage anesthesia. This is a period which affords efficient relaxation and at the same time a maximum of safety to the patient. It is characterized by surgical anesthesia when the eyeballs are oscillating rhythmically. I have noted that with divinyl ether it was relatively easy to maintain this stage throughout the operation, and at the same time have efficient relaxation.

In only two per cent of the patients did we observe real excitement, and this was of very short duration. The rapidity of induction prevents, in even the most nervous patient, any real or prolonged stage of excitement.

The time from the beginning of the administration of the anesthetic to surgical anesthesia varied, with the type of operation. For relaxation sufficient for a laparotomy about three and a half minutes was necessary, and in extra-abdominal lesions the time was less. The following illustrations show the effect of this anesthetic: a man, aged 21, required 14 cc. of divinyl ether for the induction in an appendectomy; three and a half minutes were required from the time the anesthetic was started until the incision was made. The individual variation may be shown in a second patient, aged 23, who was well relaxed in two minutes and in which only 60 cc. of divinyl ether was used over a twenty-five minute period. For minor surgical operations the time for induction varied as a rule from twenty seconds to two minutes.

The time of anesthesia varied from ten minutes to two hours and fifty-one minutes. When the anesthetic is first administered we occasionally observed considerable mucus. This occurred even though atropine sulphate had been administered previous to operation. In the surgical out-patient department divinyl ether was given with no premedication; when mucus was present, it disappeared immediately after recovery from the anesthetic. Even in the patients who had excessive mucus there was no increased tendency to post-operative respiratory complications.

The respiration was, as a rule, quiet, except when there was a considerable accumulation of mucus. Generally the respiratory rate became slower during the period of surgical anesthesia. The muscular relaxation was as good as that obtained with diethyl ether, and was sufficient for the most extensive laparotomy or orthopedic manipulations.

In only a few patients was cyanosis observed. One of these patients was a child aged 15 months to whom the anesthetic was being given for an ophthalmic operation. The child became cyanotic and cessation of respiration rapidly followed. The pulse remained of excellent quality and after a very brief period of artificial respiration the color became good and normal respiration was resumed.

Records of the blood pressure were kept during 100 operations. In eight patients there was a fall from 10 to 19 percent from the pre-anesthetic level, while in five patients there was a drop of 20 percent or more. In the remaining patients the fall was less than 10 percent.

The anesthetic was used in patients with a variety of cardiac diseases, including advanced myocardiac damage, without any untoward effect.

The amount of divinyl ether necessary for maintenance of anesthesia was on the average about 2 cc. per minute. The tendency was at first to use more than necessary—basing the rate of the drop on experience with the administration of diethyl ether.

Recovery was unusually rapid. It was often possible to have the patient speaking at the time of closure. Recovery was as a rule smooth, and was rarely accompanied by any excitement. In an operation lasting 10 to 40 minutes the usual period of recovery is from 30 seconds to 5 minutes. In a patient with carcinoma of the breast the duration of the operation was 1 hour and 22 minutes, and the time from complete withdrawal of the anesthetic to recovery was 20 seconds. When preliminary narcotics were used, the period of recovery was sometimes longer.

Vomiting during the recovery period occurred in several of the cases and this was because mucus was present, and in only one instance did we believe that exaggerated vomiting was related to the anesthetic. In a number of patients who had recently eaten, the infrequency of vomiting was favorably noted. In post operative patients who were allowed food the rapid return of appetite was apparent.

The urine was examined before and for several days after operation in 250 cases and in no instance was there any evidence of renal irritation. The anesthetic was used in a number of urologic operations.

The anesthetic has been administered as often as 5 times to the same patient. It has been administered to a number of patients who previously have had other anesthetics, and in every instance they expressed the opinion that the induction and recovery with divinyl ether was more pleasant.

At a meeting of physiologists, divinyl ether was administered three times to Dr. Ravdin the Professor of Physiology in the University, and to three members of the surgical department.

The surgical experience is based on observation of general surgeons, orthopedists, urologists, neurosurgeons and otolaryngologists and ophthalmic surgeons. We have used it successfully in all cases for extraction of teeth, because its rapid induction and recovery make it ideal.

In conclusion: Divinyl ether has found a place in anesthesia, and will undoubtedly take its place with our leading anesthetics.

It has found a place in our work and we surely would feel the loss of the product were it taken away from our clinic.

## STATE ASSOCIATION ANNUAL MEETINGS

The second annual meeting of the Ohio State Association of Nurse Anesthetists will be held in conjunction with the Ohio Hospital Association April 3rd and 4th, 1935, at the Deshler-Wallick Hotel, Columbus, Ohio.

President—Mrs. Mary A. Ware, Children's Hospital, Cincinnati, O.

Secretary-Treasurer—Miss Naomi Butler, Cincinnati General Hospital, Cincinnati, Ohio.

Chairman Local Arrangements Committee—Miss Mildred Sloat, Mount Carmel Hospital, Columbus, Ohio.

The second annual meeting of the New York State Association of Nurse Anesthetists will be held in conjunction with the New York Hospital Association, May 23rd and 24th, 1935, at the Hotel New Yorker, New York City.

President—Miss Cora McKay, Albany Hospital, Albany, N. Y.

Secretary-Treasurer—Miss Ida M. Edwards, Strong Memorial Hospital, Rochester, N. Y.

The fourth annual meeting of the Pennsylvania State Association of Nurse Anesthetists will be held in conjunction with the Pennsylvania Hospital Association, May 8 to 10th, 1935, Philadelphia, Pa.

President—Miss Mary E. Walton, 3344 Fifth Avenue, Pittsburgh, Pa.

Treasurer—Miss Frances Shellenberger, 3344 Fifth Avenue, Pittsburgh, Pa.

## STATE AND LOCAL GROUPS IN PROCESS OF ORGANIZATION

For information write:—

California—Miss Myra B. Quarles, Childrens Hospital of the East Bay, Oakland, Calif.

Colorado—Miss Ethel F. Currie, Presbyterian Hospital, Denver, Colo.

Connecticut—Miss Helen Whitaker, Bridgeport Hospital, Bridgeport, Conn.

Florida—Mrs. Mary C. Brown, Box 77, 531 East Church St., Gainesville, Fla.

Maryland—Miss Olive L. Berger, Johns Hopkins Hospital, Baltimore, Md.

Massachusetts—Miss Eleanor Fitzgerald, Beth Israel Hospital, 330 Brookline Ave., Boston, Mass.

Minnesota—Miss Theresa B. Conlon, Gillette State Hospital, St. Paul, Minn.

Missouri—Miss Helen Lamb, Barnes Hospital, St. Louis, Mo.

Dallas, Texas—Miss Lucille Mullen, Parkland Hospital, Dallas, Tex.

# A MESSAGE TO THE ANESTHETISTS OF ALABAMA

From

Verna M. Rice,

President Alabama State Association of Nurse Anesthetists

An organization needs the full support of every individual whose name appears on its roll call, and certainly we cannot stress too emphatically the dire need of this loyalty to a young organization.

Loyalty in the individual is reflected in a great measure through the state body, and in a still greater manner the same principle is magnified in the parent or National organization.

If we do not give the very best that is in us, how can we hope for its ultimate success? On the other hand, if we lend our support to the limit, we can definitely expect and obtain great success, with achievements reaching far beyond our fondest hopes.

Do not look for perfection in leadership. This cannot be a realization until the machinery of a body has moulded it into shape, so to speak, by correcting errors occurring here and there, unintentionally, in its infancy. The Leader of our country pleads for forbearance in his new undertakings. Why should not we make the same plea and give the same consideration to the leaders of our organization? Much can be accomplished by constructive assistance and this alone will tend to offset any destructive forces.

As individual nurse anesthetists, we need the backing and the prestige that the National Association of Nurse Anesthetists affords us, and in turn it must have the stimulus of our undaunted assistance for its progress.

Officers of the Alabama State Association of Nurse Anesthetists:

President—Miss Verna M. Rice, R. F. D. No. 1, Box 116, Mobile, Ala.

First Vice President—Miss Alma Clyde Foust, Colbert County Hospital, Sheffield, Ala.

Second Vice President—Miss Fannie R. Bell, St. Vincent's Hospital, Birmingham, Ala.

Secretary-Treasurer—Mrs. Elsie D. Long, 306 Medical Arts Bldg., Birmingham, Ala.

## MEMBERSHIP
## NATIONAL ASSOCIATION OF NURSE ANESTHETISTS

January 1st, 1935

| | | | |
|---|---|---|---|
| Alabama | 17 | Nevada | — |
| Arizona | 0 | New Hampshire | — |
| Arkansas | 7 | New Jersey | 19 |
| California | 41 | New Mexico | — |
| Colorado | 6 | New York | 162 |
| Connecticut | 17 | North Carolina | 6 |
| Delaware | 1 | North Dakota | 5 |
| District of Columbia | 3 | Ohio | 101 |
| Florida | 4 | Oklahoma | 4 |
| Georgia | 6 | Oregon | 9 |
| Idaho | 3 | Pennsylvania | 144 |
| Illinois | 71 | Rhode Island | 1 |
| Indiana | 8 | South Carolina | 3 |
| Iowa | 5 | South Dakota | 1 |
| Kansas | 5 | Tennessee | 30 |
| Kentucky | 7 | Texas | 32 |
| Louisiana | 7 | Utah | 7 |
| Maine | 2 | Vermont | 1 |
| Maryland | 12 | Virginia | 19 |
| Massachusetts | 12 | Washington | 15 |
| Michigan | 15 | West Virginia | 6 |
| Minnesota | 13 | Wisconsin | 31 |
| Mississippi | 7 | Wyoming | — |
| Missouri | 35 | Canada | 1 |
| Montana | 3 | Foreign | 5 |
| Nebraska | 13 | | |

Total 922

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## NEWS ITEMS

Miss Gladys Lindberg has returned to Staten Island Hospital, Staten Island, N. Y., after being employed for a time at the Tennessee Coal, Iron and Railroad Hospital, Fairfield, Ala. Miss Dorothy McCarthy, who was employed in the Maternity Division of the University Hospitals of Cleveland, succeeded Miss Lindberg at the Tennessee Coal, Iron and Railroad Hospital.

Miss Mary C. Strayer, formerly located at Jefferson Hospital, Roanoke, Va. resigned to accept a position at Conemaugh Valley Memorial Hospital, Johnstown, Pa. Miss Ida Marie Farris, formerly employed at the University of Virginia Hospital, University, Va. succeeded Miss Strayer at Jefferson Hospital.

Miss Clara A. Vezina, formerly employed at the University Hospitals of Cleveland, is now located at Brooklyn Hospital, Brooklyn, N. Y.

Miss Grace Wetzel, formerly of South Baltimore Hospital, Baltimore, Md. is now employed at St. Barnabas Hospital, Portland, Maine.

# Obituaries

Miss Marion J. Ross died at her home in Pittsburgh, Penna., on October 1st, 1934. Miss Ross served abroad during the war. She was employed at Harper Hospital, Detroit, Mich., 1922-23, and at Sol-E-Mar Hospital, South Dartmouth, Mass., 1924-31. Miss Ross was one of the first anesthetists to join the National organization and was always an interested and loyal supporter.

Miss Ida V. Holt died in Cincinnati, Ohio, December 26, 1934. The following positions were held by Miss Holt previous to her career in anesthesia: Head nurse, Barnes Hospital, St. Louis, Mo.; Dispensary Supervisor, Vanderbilt Hospital, Nashville, Tenn.; Assistant Superintendent of Nurses, St. Luke's Hospital, Cleveland, Ohio. For four years prior to her death Miss Holt had been employed as Assistant Anesthetist at the Children's Hospital, Cincinnati, Ohio. Miss Holt was one of the first members of the National Association and was always deeply interested in the future of the organization.

## NEWS ITEMS

Miss Margaret Giffen has accepted a position at Valley Hospital, Sewickley, Penna.

Miss Leona Bridenhagen has left Milwaukee General Hospital, Milwaukee, Wis. and is now located at Bellin Memorial Hospital, Green Bay, Wis.

Miss Norbeth W. Duby, formerly employed at West Frankfort Union Hospital, is now located at Evangelical Deaconess Hospital, Milwaukee, Wis.

Miss Aimee L. Doerr has resigned her position at Hotel Dieu Hospital, El Paso, Texas and is now employed at Multnomah Hospital, Portland, Oregon.

Miss Marian Cummings, formerly of Newton Memorial Hospital, Newton, N. J. is now at Franklin Hospital, Franklin, N. J.

Miss Friedah M. De Vet, formerly employed at Misericordia Hospital, Milwaukee, Wis. is now employed by Drs. Watt & Watt, 1411 San Antonio St., Austin, Texas.

Miss Jennie A. Card, formerly at Hillman Hospital, Birmingham, Ala. is now at Gorgas Hospital, Birmingham.

Miss Dorothy N. Calder, formerly located at Reading Hospital, Reading, Penna., has accepted a position at Yonkers General Hospital, Yonkers, N. Y.

Mrs. Anne C. Force, of Long Beach, Calif. is employed at Kingston Hospital, Kingston, N. Y.

Miss Mayme C. Garrison, of Pocatello, Idaho is now employed at Latter Day Saints Hospital, Salt Lake City, Utah.

Miss Ruth S. Gilmore has left Braddock General Hospital, Braddock, Pa. and is now located at Butler County Memorial Hospital, Butler, Pa.

Miss Theresa Kossack, formerly employed at University Hospital, Coral Gables, Fla. is now at Dade County Hospital, Miami, Fla.

Miss Mary E. Mazza, formerly of Dubuque Clinic, Dubuque, Iowa, is now located at Mary's Help Hospital, San Francisco, Calif.

Miss Alice M. Racette resigned her position at Montefiore Hospital, Pittsburgh, Pa. and accepted a position at Ellis Hospital, Schenectady, N. Y.

Miss Frieda Reemtsma, formerly of Wichita General Hospital, Wichita Falls, Texas, is now employed at North Hudson Hospital, Weehawken, N. J.

Miss Mildred Ritzert is now employed at Eye and Ear Hospital, Pittsburgh, Pa.

Miss Olga E. Schreiber, formerly at St. Luke's Hospital, Spokane, Wash. is now at St. Joseph Hospital, Tacoma, Wash.

Miss Marguerite von Schaeffer, formerly employed at St. Charles Hospital, Bend, Oregon, is now located at St. Ignatius Hospital, Colfax, Wash.

Miss Catherine E. Yarnall, formerly employed at Johns Hopkins Hospital, is now located at Reading Hospital, Reading, Pa.

Miss Ruth E. Strom, of Ridgefield, N. J. is now employed by Dr. F. E. Schmidt, 144 Harrison St., East Orange, N. J.

Miss Ada I. Kemp, formerly employed at West Nebraska M. E. Hospital, Scottsbluff, Nebr., is now located at Jennie Edmundson Hospital, Council Bluffs, Iowa.

Miss Cleo Duncan is now employed at Sutter Hospital, Sacramento, Calif.

Miss Hazel Hall of Victoria, Va. has accepted the position of anesthetist at Northampton-Accomac Memorial Hospital, Nassawadox, Va. Miss Margaret F. Rudkin resigned and is spending a short time with friends at Weirwood, Va.

Miss Ada Hemsley, formerly anesthetist at the Bradford Hospital, Bradford, Penna., has accepted a position as anesthetist at the Methodist Hospital, Memphis, Tenn. Miss Dorothy Carr, who held this position, resigned to take a vacation and is now at Omaha, Nebr.

We take pleasure in announcing the following marriages:

Miss Gertrude Alexander, of Crisler Clinic, Memphis, Tenn., is now Mrs. Charles Edward Troster, 654 Stonewall Place, Memphis, Tenn.

Miss Pauline Harrison, of Brooklyn Hospital, Brooklyn, N. Y., is now Mrs. Karl Bruce Edwards, 35-28 153rd St., Flushing, L. I., N. Y.

Miss Edmunda E. Ringelman, Albany Hospital, Albany, N. Y., is now Mrs. John E. Gainor, 273 Delaware Ave., Elsmer, N. Y.

THE THIRD ANNUAL MEETING OF THE NATIONAL ASSOCIATION OF NURSE ANESTHETISTS WILL BE HELD OCTOBER 1st, 2nd AND 3rd, 1935, IN ST. LOUIS, MO., IN CONJUNCTION WITH THE AMERICAN HOSPITAL ASSOCIATION.

FOR INFORMATION WRITE MARY LUCILE GOODMAN, 2065 ADELBERT ROAD, CLEVELAND, OHIO.

**At a recent meeting of the Board of Trustees, Miss Mary Lucile Goodman was appointed Executive Secretary of the Association to fill the position made vacant by the resignation of Mrs. Florence H. Boswell. The office of the Executive Secretary will be located at 2065 Adelbert Road, Cleveland, Ohio.**

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